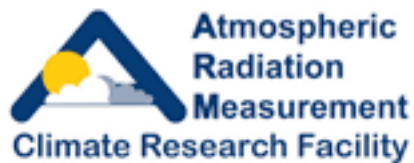


IOP Weekly Meeting: June 20, 2011



A National User Facility
for the Scientific Community



BROOKHAVEN
NATIONAL LABORATORY

a passion for discovery



Purpose of Weekly Meeting

Purpose: Weekly informational meeting on the Aerosol IOP. This includes:

- Logistical Information
- Instrument and Measurement Status Reports
- Safety Observations
- Noteworthy Field Observations
- New Business
- Presentations

Where/When: Monday mornings (10-11 am) in 815E conference room.

Goal is to keep meeting < 1 hr with offline follow ups

Outline for June 20th meeting

Infrastructure Status Report: Springston

- MAOS/AMF2

MET Field Infrastructure Status Report: Springston/Behrens

- Power, Pad and Internet

Instruments/Measurements Status Reports

- Mentors
- Guests
- Interns

Safety Observations

- Status of Training (Williams/Zuhoski)
- Working alone ('2-person' rule)

New Business

- Filenaming convention (YYYYMMDD_Instrument.xxx)
- Data Streams (ASCII; 1-min avg [where appropriate]; UTC)

Presentations:

- IOP Wikipage: Cialella/Schreiber
- An overview on measurement expectations and logistics of IOP: Sedlacek

Aerosol Lifecycle IOP: Motivation

FY09/FY10 ARRA-sponsored procurement of three new Aerosol Observing Systems (AOS) significantly increased DOE's aerosol science capabilities

Two Flavors: 'core' AOS and MAOS ([See Springston tour of platforms](#))

These new platforms need to be tested and, where possible, inter-compared

Proposal was put forth to DOE for an IOP that had three objectives:

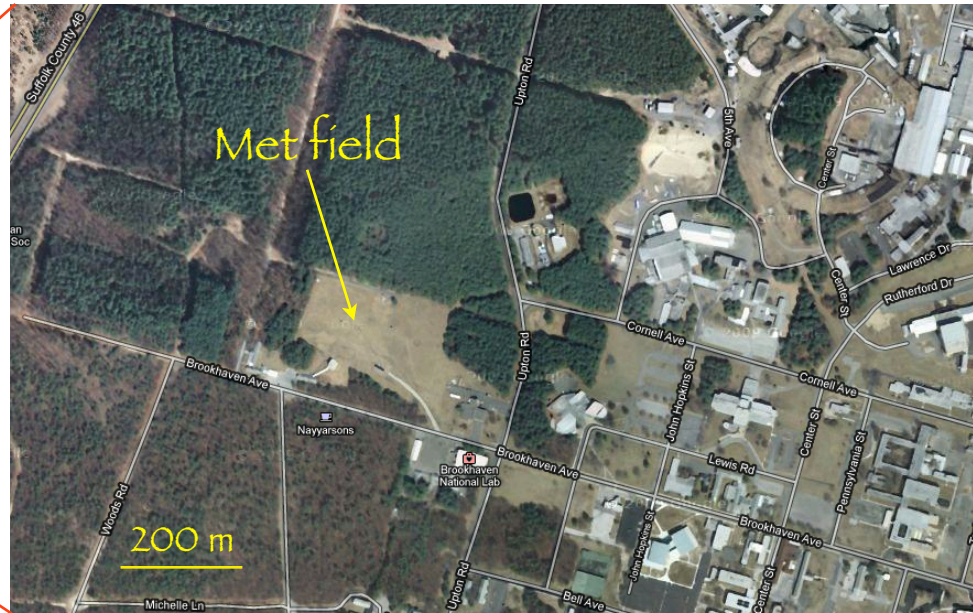
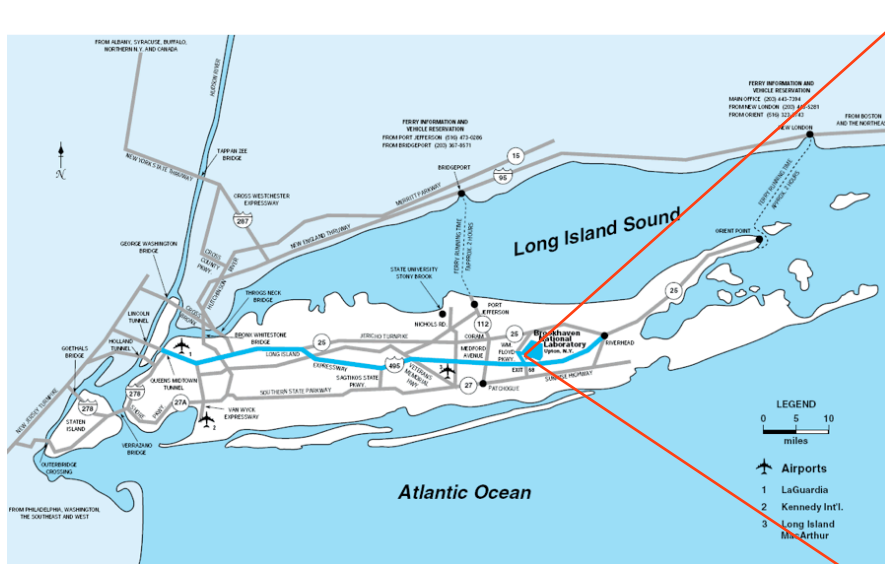
- Develop new measurement strategies that reflect the addition to ACRF of 'research grade' instruments (MAOS)
- Maiden foreign deployment of MAOS will be GVAX, requiring the training of in-field technicians.
- Long Island offers a unique region for intensive aerosol observation



Aerosol Lifecycle IOP: Infrastructure Motivation

- Research grade instruments require new measurement strategies
(“Think of the MAOS as the G-1 on the ground.” Springston, 2009)
 - Subset of MAOS instruments are operator-intensive (PILS-IC-WSOC & PTR-ToF-MS)
 - Some instruments generate huge data sets (PTR-ToF-MS & SP2)
- Instrument Intercomparisons
 - Nephelometer: (Calculated versus observed scattering)
 - CPC/SMPS/UHSAS: (number conc., size distributions)
 - PSAP/PASS-3: (absorption intercomparison)
 - PILS/HR-AMS/ACSM: (composition)
 - HR-AMS/ACSM: (intercomparison)
 - SP2/Aethalometer: (BC mass conc. intercomparison)
 - CCN+Size distribution+composition \Rightarrow closure
- Conduct a ‘shake out’ of the MAOS platform prior to the GVAX

Aerosol Lifecycle IOP Site: Meteorology Field



Surface: Precipitation

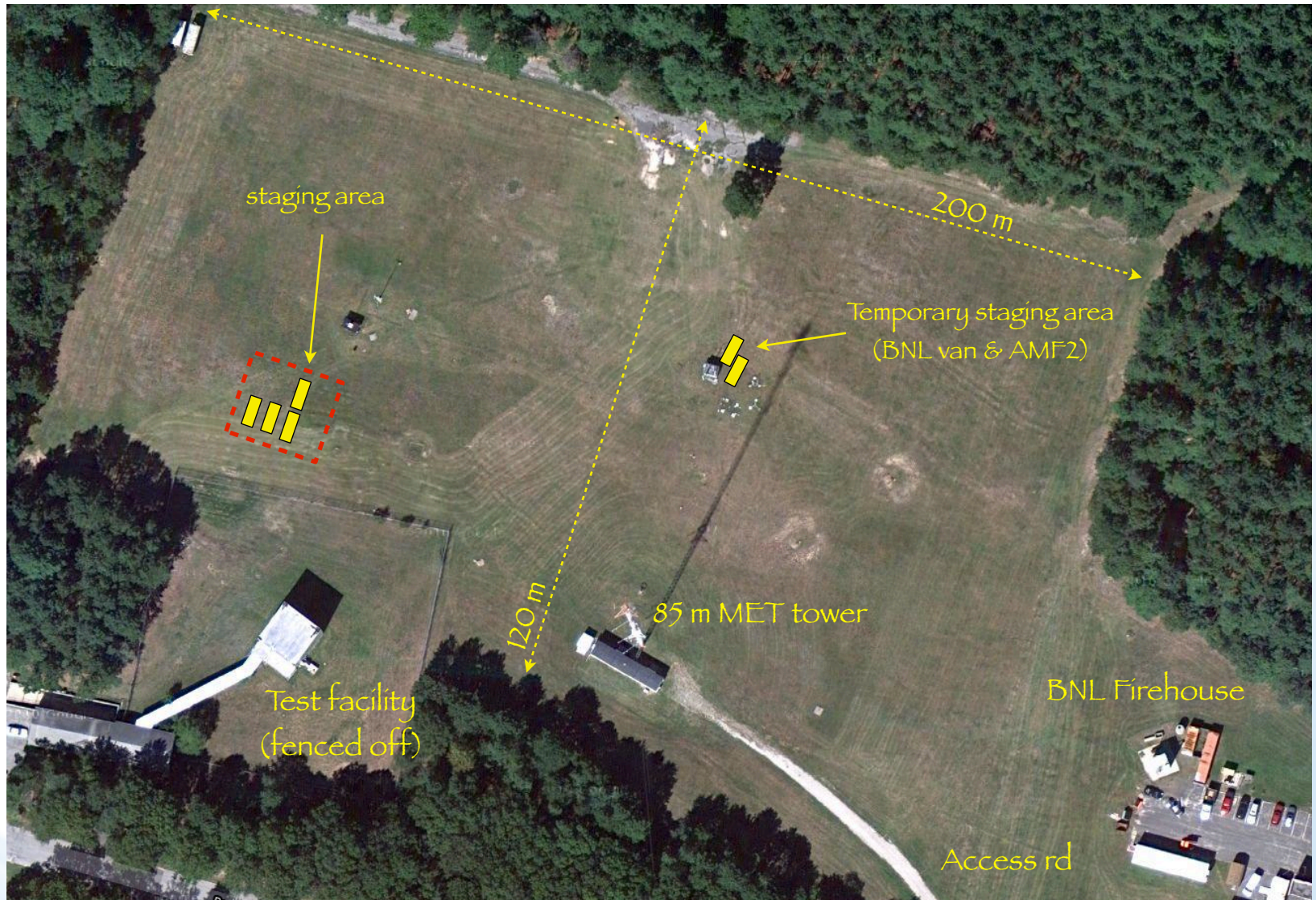
2 meters: Temp, RH, Pressure

10 meters: Temp, Wind Speed, Wind Direction

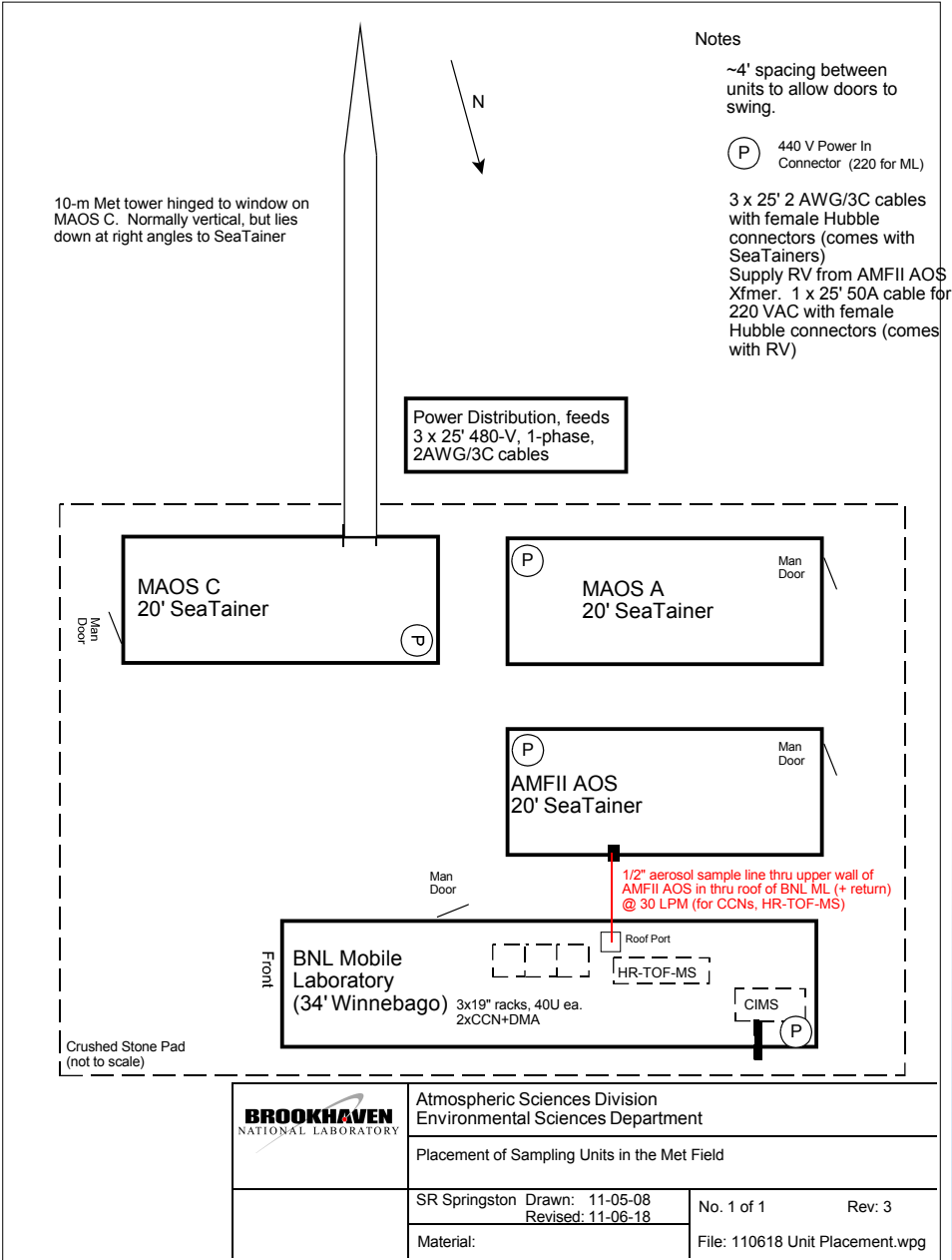
85 meters: Temp, Wind Speed, Wind Direction

New measurements of T, WS, & WD at 50 meters this summer

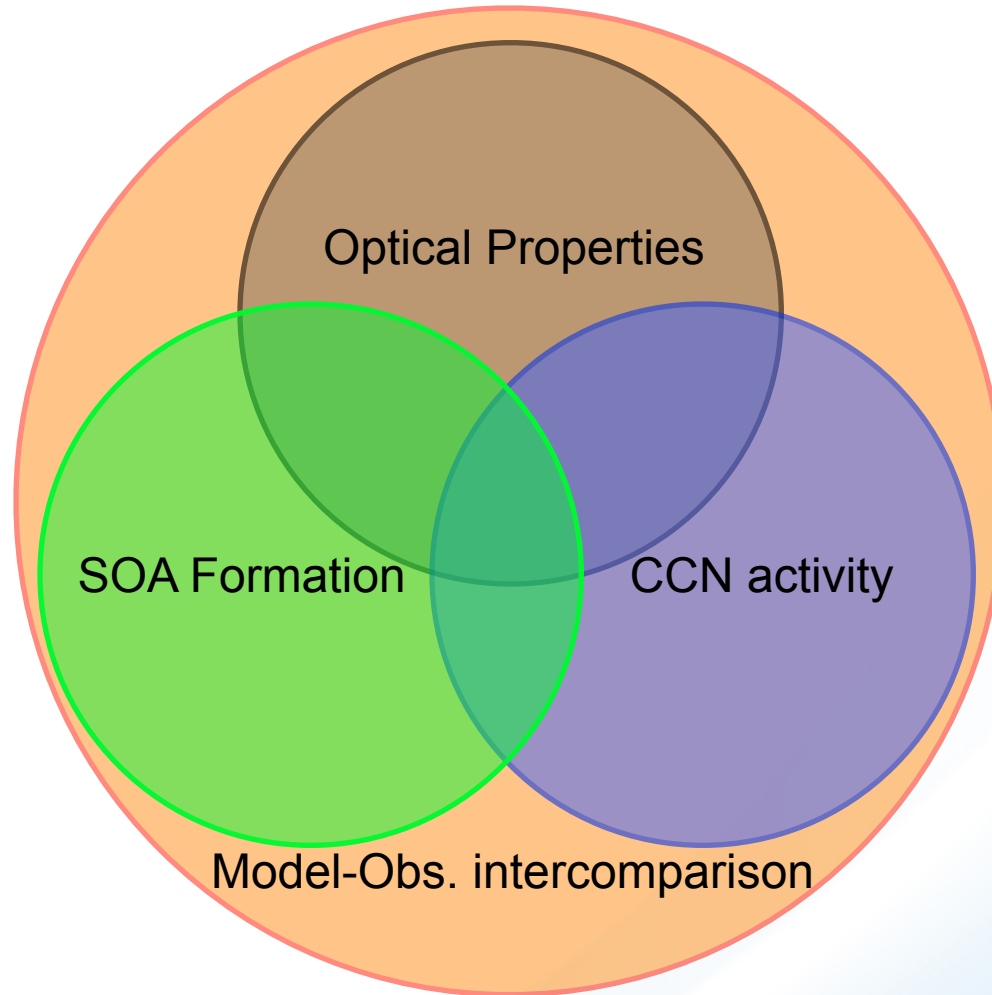
Aerosol Lifecycle IOP Site: MET field



Proposed SeaTainer Configurations



Scientific foci of Aerosol IOP



A key component of these three focus areas is that aerosol properties will be determined as function of atmospheric processing, chemical conditions and source type.

Aerosol Lifecycle IOP: Air Mass Types

Opportunity to conduct intensive aerosol observations in a region that offers biogenic, marine, and urban emissions.

Urban emission predominately from the west and southwest

- Biogenic emission predominately from the north and northeast
- Clean marine atmosphere from the south
- Atmospheric transport time of hours to days
- Absent strong synoptic forcing, a sea breeze develops in the afternoon
- Haze events (pollution alerts) can be expected
- Good chance of catching an intense but distant biomass burning event

Aerosol Lifecycle IOP: NYC-based Studies



Aerosol Lifecycle IOP: NYC-based Studies

Queens College:

PM_{2.5} Technology Assessment and Characterization Study- NY (PMTACS-NY)

- Queens college
- three deployments (summer 2001, winter 2004 & summer 2009)

Instrument Suite:

HR-ToF-AMS and Q-AMS

1- λ Photoacoustic spectrometer (B_{abs})

TSI fast mobility particle sizer

CCN

Aerodyne QCL (formaldehyde & NO₂)

Li-COR CO₂ analyzer

BTEX analyzer for benzene, toluene, ethylbenzene and xylenes

2B technologies analyzers for O₃, NO and NO₂

South Bronx:

Multi-year hourly measurements of EC and OC

- Ambient air monitoring site at NYC intermediate school (IS-52)

Instrument Suite:

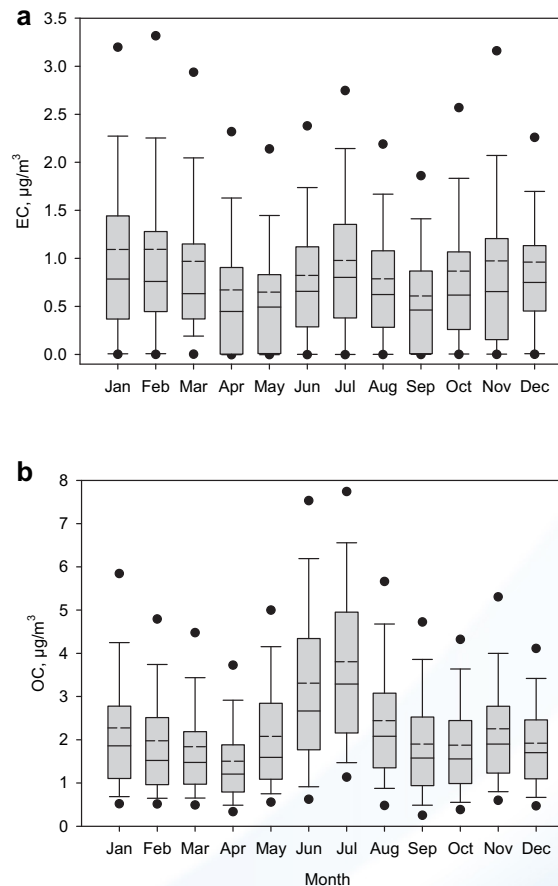
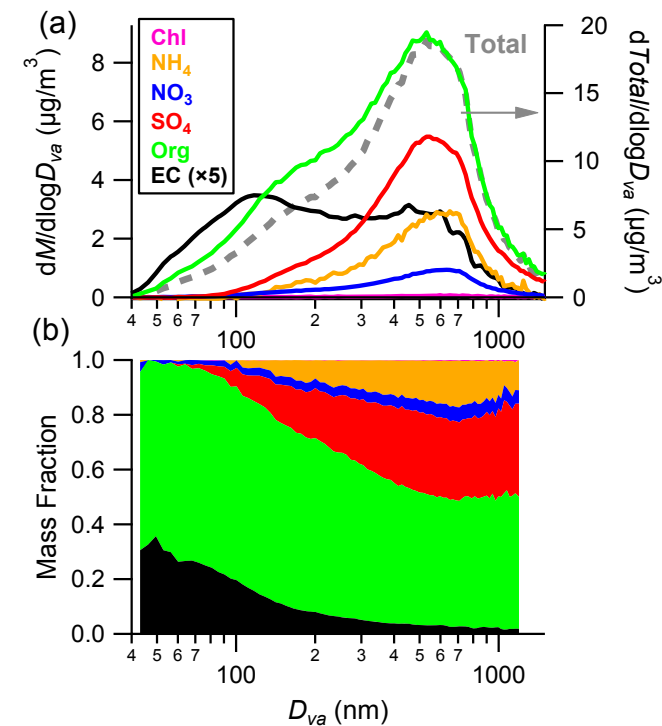
Semi-continuous OCEC carbon analyzer (Sunset Labs) - hourly

880 nm Aethalometer for LAC (rBC) measurement (5-min resolution averaged hourly)

Thermo Scientific 5020C aerosol sulfate

Met data

Aerosol Lifecycle IOP: NYC-based Studies



Rattigan et al., Atmos. Env. 2010

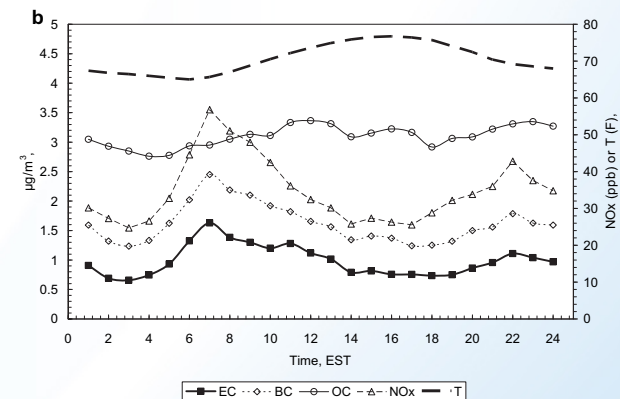
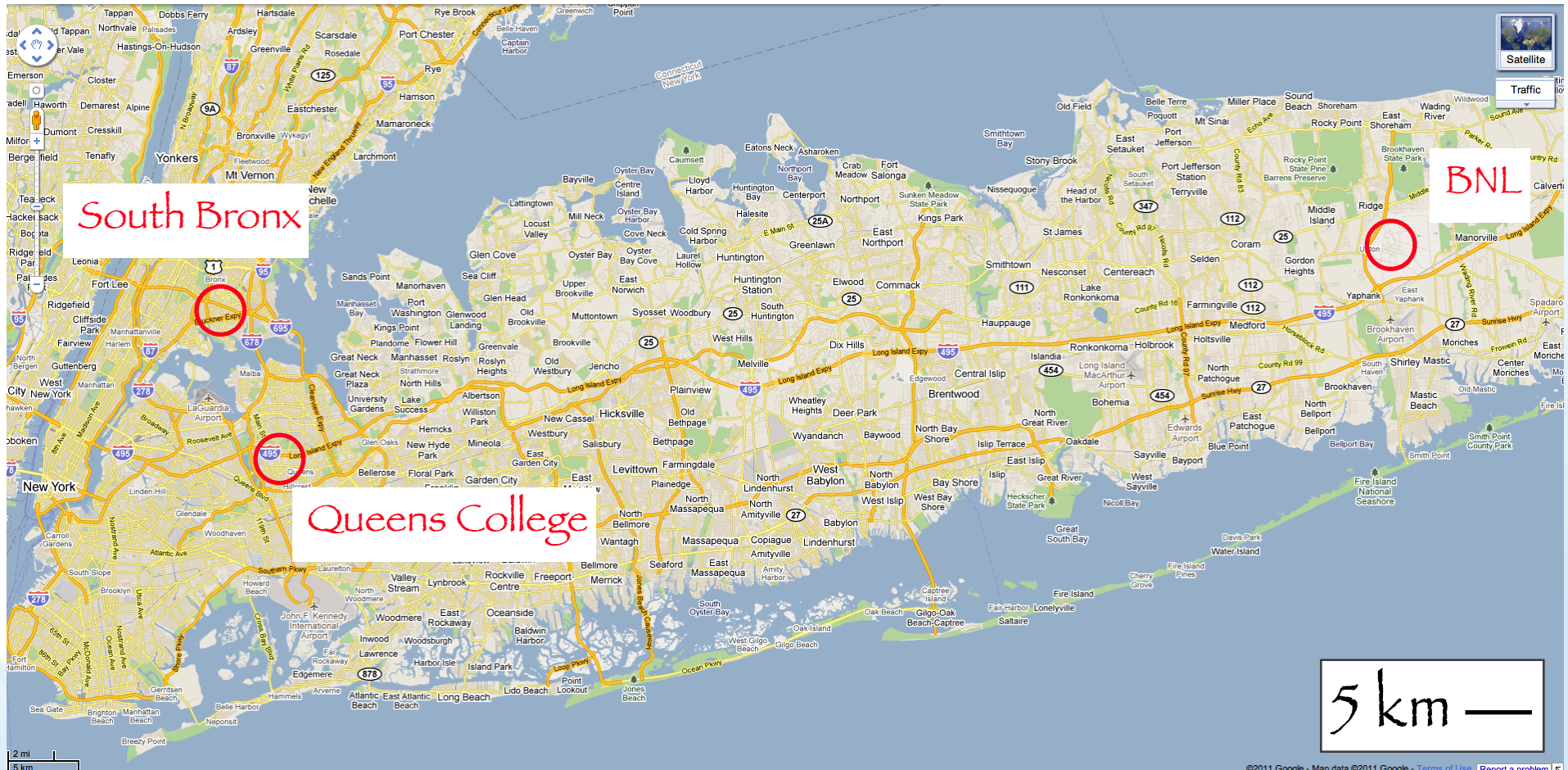


Fig. 6. Average size distributions of (a) mass concentrations and (b) fractional compositions of submicron aerosol species for the entire study. The size distribution of EC was estimated based on that of m/z 57 after removing the contribution of $\text{C}_3\text{H}_5\text{O}^+$.

Sun et al., Atmos. Chem. Phys. 2011

Aerosol Lifecycle IOP: NYC-BNL connection



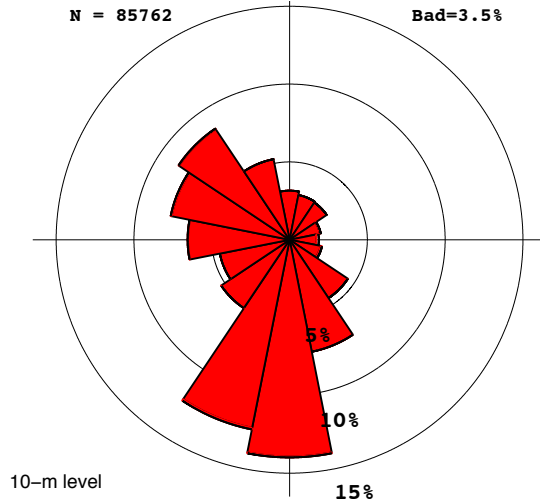
Aerosol Lifecycle IOP: Wind Rose Plots

WIND ROSES FOR Jun 2007 thru Jul 2007

N = 85762

Calm=8.4%

Bad=3.5%

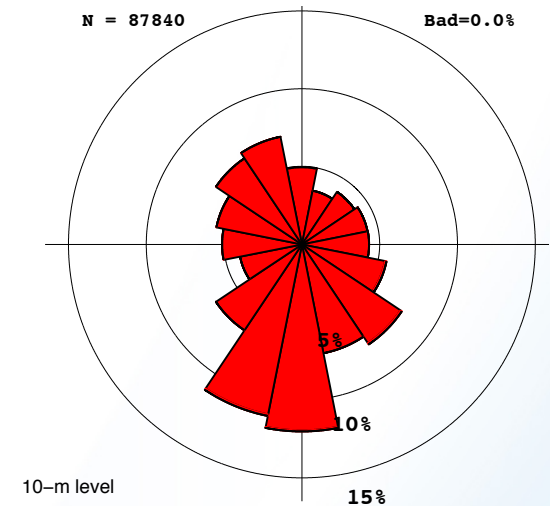


WIND ROSES FOR Jun 2009 thru Jul 2009

N = 87840

Calm=0.0%

Bad=0.0%

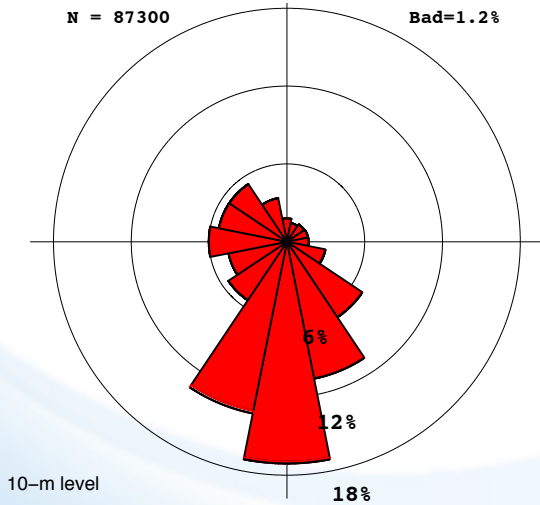


WIND ROSES FOR Jun 2008 thru Jul 2008

N = 87300

Calm=10.1%

Bad=1.2%

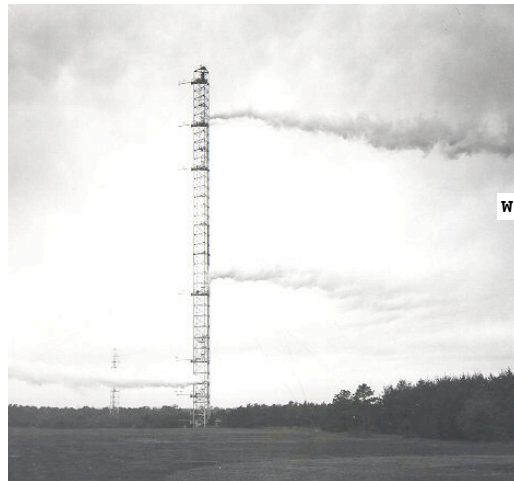
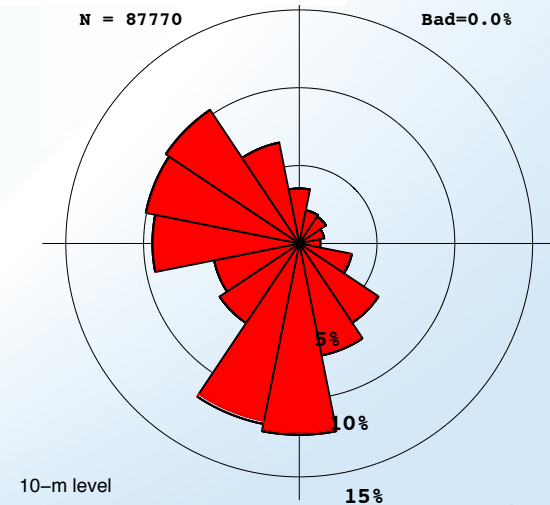


WIND ROSES FOR Jun 2010 thru Jul 2010

N = 87770

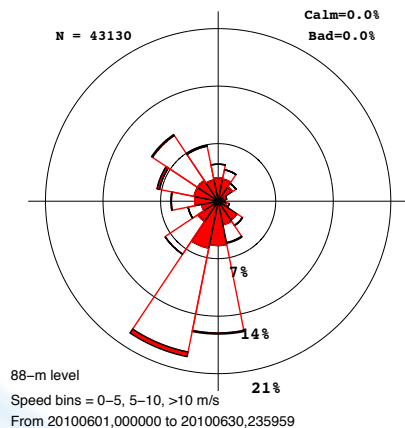
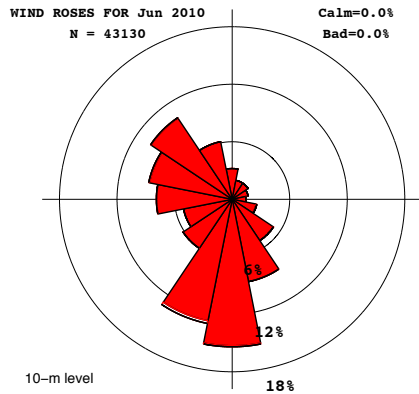
Calm=0.0%

Bad=0.0%

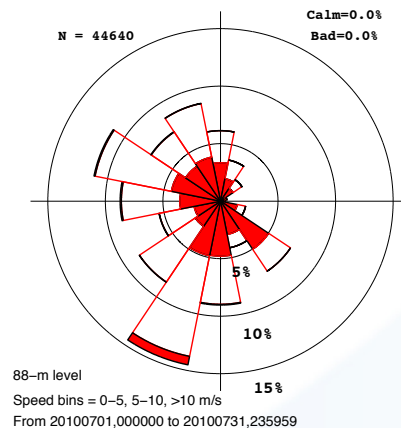
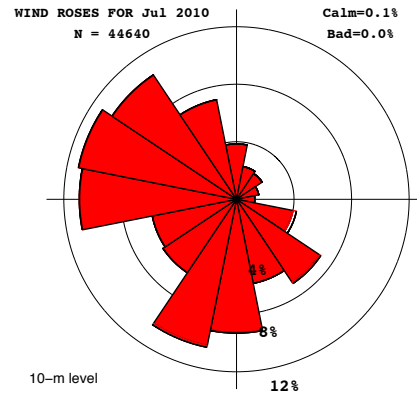


Aerosol Lifecycle IOP: Wind Rose Plots 2010

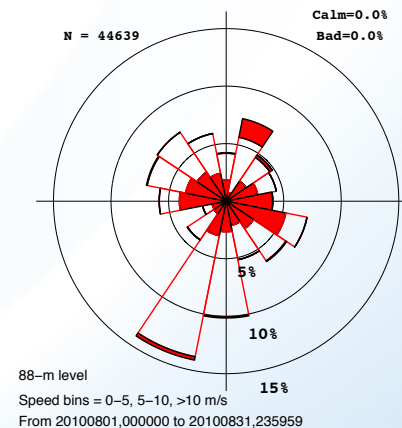
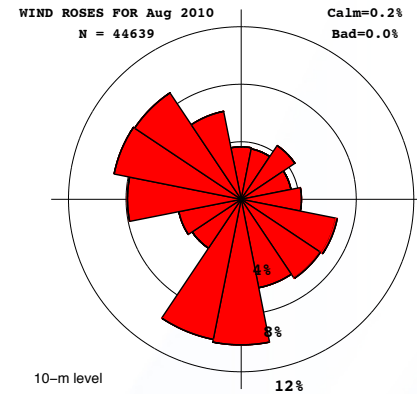
June



July



August



10 m

88 m

Glance into the near term

- June 27th Meeting will be led by Stephen Springston
- July 4th mtg will be postponed until July 6th
- Can expect a visit from DOE (Mather, Williamson & Voyles) week of 7/25